European Scientific Journal May 2014 /SPECIAL/ edition ISSN: 1857 – 7881 (Print) e - ISSN 1857- 7431

SUSTAINABLE DEVELOPMENT IN ARCHITECTURAL EDUCATION

Iva Poslusna, Ass. prof. arch., PhD
Hana Urbaskova, Prof. Ing. arch., PhD
Faculty of Architecture, Brno University of Technology, Czech Republic

Abstract

The Faculty of Architecture of the Brno University of Technology represents an art school at a technical university. That is why its study programmes include subject both from the field of fine arts as well as from technology which get students closer to implement their science. Future architects and urban designers get acquainted with technical creation tools to achieve the goals of their study programmes - to acquire such knowledge and skills to make a BA graduate capable of dealing with designing residential, public and production structures, reconstructions of buildings or their interiors - all that from wider urban relations and basic architectural concept of the work to the urban-design, architectural or technical details. Graduates with Ing. Arch. degree will ten become experts - creative workers who can manage project designing and management activities included in the process of investment development in the whole complex of their profession.

We pay close attention to ensure that the education acquired forms basic dispositions for activities which will fulfil all attributes of optimum formation of the environment and principles of sustainable development.

The process of architectural creation fulfilment as a scientific path is conclusively demonstrated to students directly in classes, accompanying workshops, involvement in projects with partner schools, towns, professional institutions. The school then presents outputs of their projects, competitions and stays at internships at exhibitions even in renowned galleries, at conferences and in professional press.

Keywords: Architecture, urban design, sustainable development, education

Introduction

Architects and urban designers strive to form material environment that will contribute to the improvement of quality of life. What should such environment look like is a question that we have been trying to answer for centuries. At the beginning of the 21st century, architects and urban designers look for solutions that would preserve architectural heritage and historical values and at the same time eliminate land utilization with negative impacts on landscape; they consider economic use of resources and they can be a positive influence on sustainable development. In this process, education of architects and urban designers in the context of sustainable development plays a significant role.

Main Text

The Faculty of Architecture in Brno is aware that students of architecture, as significant forming agents of material development, should be systematically informed on the condition of development in technologies allowing environmental solutions to urban-design and architectural tasks and it makes considerable effort to improve conditions in teaching architectural and urban-design disciplines.

At present, the faculty has finished a project from European Structural Funds “Implementation of Sustainable Development Principles into Education of Architects”. We

have innovated 20 subjects within the project; we have prepared e-learning support allowing the students to access study materials and use them also for home preparation and self-study. New lectures and teaching aids have been made as well as catalogues of reference examples of environmental and architectural tasks; all that with respect to the latest trends in the field and practical necessities.

In order to make students well-acquainted with natural building materials such as wood, clay, straw and with the craft of building, we hold student workshops. The faculty inner yard saw students building a wooden statue made of planed spruce wood under supervision of Prof. Rajnis.

For architecture students, building something with their own hands represents non-transferable and very significant experience. However, this was not only about teaching the craft of wood construction. A very strong and coherent team was formed during the works which as able to cooperate even under fairly complex division of labour. At the same time, a perfect platform has formed in the yard for encounters of students, teachers, faculty employees and external visitors. Utilization of natural materials and searching for building principles natural for people and friendly for the environment were widely discussed. Other Czech, Austrian and German universities showed interest in similar events.

Workshops are organized in cooperation with doctoral students and the Student Community of the Faculty of Architecture (SOFA). Mutual cooperation among students of the bachelor, master and doctoral study programmes has been manifesting in a positive way in improved quality of students' and dissertation theses.

Every year, the university organizes an international conference of doctoral studies in the field of architecture and urban design “Science in Building” and an international conference “Healthy Houses” where Czech experts exchange knowledge and experience from the process of sustainable structure building and evaluation of their optimal interior environment with their foreign colleagues.

In the Czech Republic, development of energy-saving and self-sufficient buildings has not spread too much yet. The problem is lack of quality project designers, experienced construction companies and low awareness of investors. The Faculty of Architecture plays a significant role in education and promotion in the field of sustainable building, together with a non-profit organization “Passive House Centre”. Last year, the foundation Nadace Partnerství implemented an ecological project in the Brno city centre called “Open Garden” as a continuation of the municipal park of the Spilberk castle. It is a counselling and educational centre of non-profit organizations, designed as a green structure using state-of-the-art technologies. The building is heated and cooled using thermal pumps, it recycles rainwater from its roofs and paved areas of the garden and uses it for flushing toilets and watering the garden.

Apart from teaching spaces for experiments performed by school teams, the “Open Garden” also offers interactive teaching routes, stations for watching seasonal natural phenomena, stations designed for understanding physical phenomena and elements and for using the energy of the Sun, wind or water, as well as touch and smell routes for the handicapped. The complete project documentation from the study to the implementation project was prepared by the studio Projektil Architekti s.r.o. which won the “The Award of the Minister of the Environment for the Building Energy Saving and Efficiency” within the competition Stavba roku 2013 (The Building of the Year 2013). Therefore, FA students had a unique opportunity to watch the course of construction of a house which is one of the best examples of green building in the Czech Republic and to acquire practical experience.

Construction of a detached family house designed by our professor Hana Urbaskova as a passive-standard wooden structure also served as a “school laboratory” for our students in the past. The house project was awarded in the competition “ROCKHOUSE 2009” and the

house implementation won the “Construction Magazine Award” in the competition Structure of the South-Moravian Region 2009.

It is an energy-saving, simple, purposeful structure with low initial and operation costs, with a healthy interior climate which positively influences the feeling of warm comfort. During construction, students had the opportunity to see for themselves that in order to achieve quality, cooperation among the project designer, investor, construction supervisor and construction companies is crucial since a passive-standard house will work only when everything - the house design, project and construction - is provided by professionals.

Prior to the construction completion, the building air-tightness was verified by means of the “blower door test”. Building thermal protection quality was verified by means of construction thermography. Surface temperatures of the building were measure using an infra-camera (thermovision) which allowed potential thermal bridges to be localised. Students have the possibility to further monitor the house in terms of its operation and to assess its interior climate.

Apart from structures in the territory of the Czech Republic, students also visit foreign structures which meet the requirements of sustainable development. Expert field trips are organized within the project “Paths to Experience” from the European Structural Funds which the faculty organizes in cooperation with the Passive House Centre. The project also allows students to go for domestic and international internship stays at project design companies developing so called “green solutions”.

Students welcome and accept the effort to interlink the teaching process with real life. This well-established interconnection between theory and practice manifests well during submissions of Bachelor and Master theses topics which are assigned in cooperation with cities. Students' works are displayed in municipal galleries and the public has the possibility to get acquainted with them. The aim of student exhibitions is to raise interest of local inhabitants in architecture as an inherent part of contemporary culture and as interest in their city. To search for answers for the questions of today together: “Is it possible to meet requirements of sustainable structures when demands of both commissioners and users keep getting higher? How should we perceive actual investments into architecture and sustainable development?”

Students' projects are also displayed in galleries together with projects and implemented works of their teachers - architects. The university also has its own exhibition premises; the “GALLERY MINI” where exhibitions alternate every 2 weeks.

Apart from tackling architectural tasks concerning sustainable development, the university also deals with issues of sustainable urban development. Within the project “AKTION Czech Republic - Austria” supporting bilateral cooperation in education and science in the tertiary sector, we have been working on the project “Current Development in the Cities of Brno and Graz in Terms of Sustainability and Energy Saving” with TU Graz and on a project called “Is it possible to connect the rescue of the industrial monument with the development of the city?” with TU Vienna. We have also been cooperating with the Donau Universität Krems on the project “Revitalization of small and medium towns in Lower Austria and South-Moravian Region” and on “Revitalization of Church Structures and Premises in NÖ and CZ”.

Partner relationships with foreign universities play a very important role in the field of education; they are developed primarily by means of international mobility project defined by the LLP Erasmus programme. Our university also cooperates with universities from countries outside the European Union. At present, our cooperation is well-developed with the Swiss university Berner Fachhochschule Architektur, Holz und Bau in Burgdorf, with TH VADUZ Hochschule Liechtenstein, IIT College of Architecture Chicago, with the Faculty of Architecture of the S.Seifullin Kazakh Agro Technical University in Astana.

In the Doctoral study programme, we have had dissertation theses by students from Iraq, Iceland, Angola, Bolivia and most recently also from Syria, Turkey and Kazakhstan. Currently, our professor, Ing. arch. Vladimir Slapeta, DrSc. is hosting at the Irwin S.Chanin School of Architecture of the Cooper Union in New York.

Innovation in teaching and cooperation with foreign faculties has reflected positively into success of our students in domestic and international competitions. For example, in 2013 our student Adela Kyselova won the 4th place in the international student competition INTERNATIONAL STUDENT DESIGN COMPETITION and students Jakub Frolik and Vojtech Kolar were successful in the INTERNATIONAL COMPETITION FOR THE MIAMI MONUMENT with their design called "GREAT SPIRIT WOODS" and they achieved the honourable mention.

Our students also achieved success in domestic competitions concerning the environment and sustainable development; e.g. DUM NOVE GENERACE 2012 (House of the New Generation), BUILDING EFFICIENCY AWARDS (BEFFA) 2012, ENVIROS 2012, REGIONAL ENVIRONMENTAL OLYMPICS 2012, ACTIVE HOUSE AWARD 2012.

The latest success our doctoral students achieved is the victory in the selection procedure for the Czech pavilion for the EXPO 2015 in Milano, Italy. Doctoral students Ing. arch. Ondrej Chybik and Ing. arch. Michal Kristof have designed the pavilion as a temporary structure consisting of containers, with simple operation and maintenance which will be disassembled after the EXPO and it will find a new purpose in the Czech Republic. The sustainable project is in accordance with the theme of the world exhibition which is "Feeding the Planet, Energy for Life" and follows the overall concept of Swiss architects Jacques Herzog and Pierre de Meuron who strived to reduce short-term fashion fads and focus more on the idea and sustainability of pavilion structures. The overall design by Herzog and de Meuron is dominated by the water channel which will bypass the entire exhibition premises. This is related to one of the key themes of the Czech pavilion - discoveries made by the Czech Republic in terms of water treatment, nanotechnologies and biochemistry applied in agriculture which push the topic development further into the future. The aim of doctoral students architects Chybik and Kristof is to create an environment with high aesthetic value using containers. They design confident architecture with contemporary expression referring to the simplicity of national style - modernism. A Czech pavilion, as they say, should be both a house and an experience.

Conclusion

Innovation of study programmes implementing the principles of sustainable development has contributed to improvement in quality and modernisation of architectural education at the FA BUT. Education of architects with the support of workshops, conferences, excursions, competitions and exhibitions has encouraged students' creative abilities, developed their independence and also their social responsibility and endurance. Students' adaptability and mobility have also seen great improvement as well as qualifications of the faculty's teachers.

The faculty strives to make its graduates from innovated study programmes capable of seeking solutions to urban-design and architectural issues as a consensus acceptable for all parties concerned which is the most efficient means of gradual fulfilment of the strategy for the environmental spatial development.

Our university also had a visit from a team of auditors in October 2012 who arrived within the international project QUESTE-SI which is organized by the EFMD (European Foundation for Management Development) and which asserts sustainability and responsibility (economic, social and ecological) as new criteria of quality. The team was formed by
Juan Jesus Perez, Full Professor, Universitat Politècnica de Catalunya, Spain

Julia Falkerby, Research Officer, KTH Stockholm, Sweden.
Jérôme Tarbès, Jet Conseil, France.
Muzio Gola, Vice-Rector for Quality, Evaluation and Accreditation, Politecnico di Torino, Italy.
They made QUESTE-SI EXTERNAL AUDIT VISITS and our faculty was evaluated to receive the QUESTE-SI Award on 28th January 2013.

References:

Urbaskova, Hana: 5E DOMU - The 5 E's of a House, FA BUT 2010, pp. 26, ISBN 978-80214-4186-6, ISSN 1213-418X
Poslusna, Iva; Urbaskova, Hana; Guzdek, Adam: Bachelor theses 2012, FA BUT 2012
Poslusna, Iva; Urbaskova, Hana; Guzdek, Adam: Master theses 2012, FA BUT 2012
http:// www.fa.vubr.cz